OCCURRENCE OF *RHYNCHOCINETES RIGENS* GORDON, 1936 (CRUSTACEA, DECAPODA, RHYNCHOCINETIDAE) IN THE INDO-PACIFIC REGION

TAKAHIRO FUJINO

Parasitological Laboratory, Faculty of Medicine, Kyushu University

With Text-figures 1–2

The caridean shrimp, *Rhynchocinetes rigens* Gordon, was first described from Madeira in 1936, and has since been recorded from the Azores, Bermuda, and the Bahamas. Manning (1961) subsequently reported it from Florida and the Virgin Islands. No other reports have been given on the distribution of this species except for the Atlantic localities. The present occurrence of the species in the Ryukyu Islands therefore greatly extends its known range to the Indo-Pacific region. This fact appears most interesting in view of the geographical distribution of coral-inhabiting caridean shrimps.

Rhynchocinetes rigens, to which the new Japanese name 'Akamon-sarasa-ebi' is now given, is characterized by a beautifully spotted red pattern on the body, and by the incomplete articulation of the rostrum with the carapace.

For comparison of the Ryukyu specimens with Atlantic ones, some specimens from Florida were borrowed through the courtesy of Dr. Fenner A. Chace, Jr.

Rhynchocinetes rigens GORDON, 1936

(New Japanese name: Akamon-sarasa-ebi)

(Figs. 1, 2)

Rhynchocinetes rigens Gordon, 1936: 76, figs. 1–5e—Madeira.
R. rigens: Burkenroad, 1939: 311—Bermuda.
R. rigens: Gurney, 1940: 200, fig. 69 (larvae)—Bermuda.
R. rigens: Figueira, 1960: 1—Azores.
R. rigens: Manning, 1961: 1, figs. 1, 2—Florida, Bahamas & Virgin Is.
R. rigens: Chace, 1972: 17— no new locality.

Description. The present specimens agree well with the original description by Gordon (1936).

The rostrum is long and strongly curved upwards, being somewhat longer than the carapace (Fig. 1). Two or four teeth are placed on the upper border in the

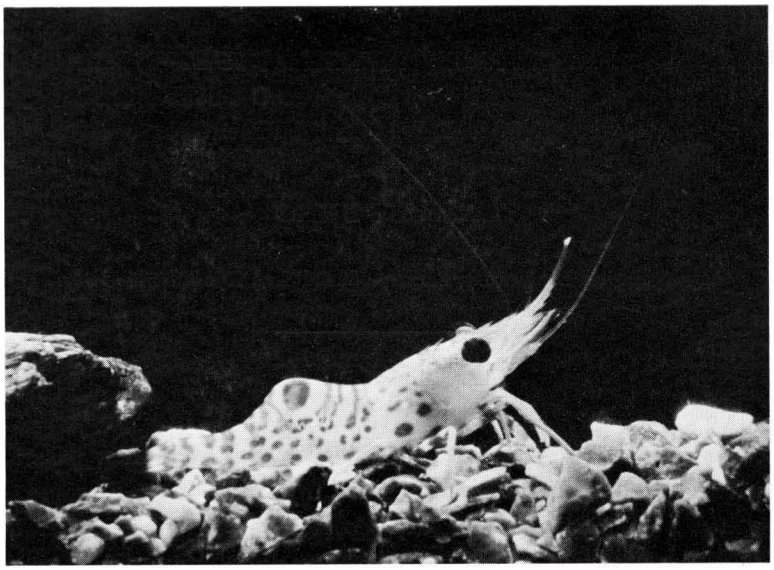

Fig. 1. *Rhynchocinetes rigens* Gordon.

proximal third of the rostrum anterior to the rostral articulation. Subterminally are two small teeth. There are ten to twelve teeth on the ventral border. The lateral ridge is distinct.

The stylocerite is long and slender, its acutely pointed tip extending to or a little beyond the end of the antennular peduncle. The outer antennular flagellum is thickened and setose in the proximal two-thirds, with the distal portion thread-like. The thickened portion fails to reach the subapical teeth on the rostrum.

The terminal tooth of the antennal scale feebly exceeds the lamella. The basicerite of the antennal peduncle bears a spine and a lobe.

The third maxilliped hardly reaches the tip of the antennal scale. The ultimate segment is one and a half times the length of the penultimate segment, with seven teeth coloured black terminally. The antepenultimate segment is somewhat shorter than the ultimate. The exopod overreaches the antepenultimate segment.

The first pereiopods reach the end of the antennal peduncle. The chela is 1.7 times as long as the carpus. The carina on the upper border of the merus is distinct and ends in a rounded angle. The second pereiopods are much more slender than the first, slightly exceeding the antennal peduncle. The carpus is 1.7 times as long as the chela.

The ambulatory pereiopods are stout. The dactylus of the third pereiopods is broad and curved, with a strong terminal claw and two smaller spines posteriorly. The propodus is four times as long as the dactylus, with a pair of spines and three other single spines on the posterior border distally. The carpus is about half as long as the propodus, armed with two spines on the outer surface. The merus is 1.4 times the length of the carpus. On the outer surface there are five spines; two, of which the distal is very strong, are close to the distal articulation, and the other

three are slightly proximal to the middle. Ventrally lie two or three spines. The ischium bears two spines. The fourth pereiopods are similar to the third in arrangement of the spines. In the fifth pereiopods the merus bears four to six spines.

In one male (cl. 13.0 mm) the endopod of the first pleopod is not yet fully developed and narrow, without the appendix interna, just as in female. In other male (cl. 13.5 mm) the endopod of the first pleopod is fully developed (Fig. 2). It is broadly expanded and nearly rectangular, both the inner and the outer margins being somewhat convex. The distal border is broadly rounded. The appendix interna, which rises near the middle of the outer border of the endopod, is broad and bell-shaped, with a narrow projection distally which is joined obliquely to the basal portion by a fine suture. The outer border is setose and folded distal to the appendix, the inner proximal border concave.

The appendix masculina on the second pleopod is slender and much shorter than the appendix interna.

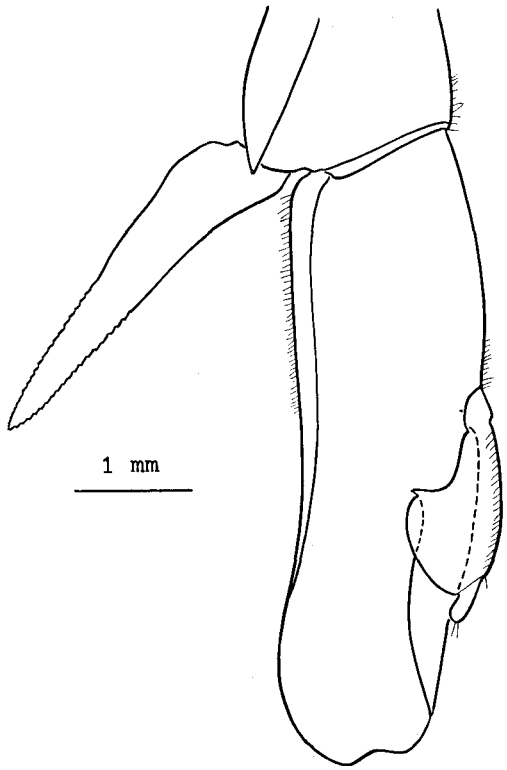

Fig. 2. *Rhynchocinetes rigens* Gordon, endopod of first pleopod of male.

Material examined. Okinawa: Minatogawa, 1973, Y. Nakasone leg. — 2 ♂♂, 1 spm. (sex uncertain).

Size (mm).

	♂	♂	spm.
Rostrum length	17.8	16.0	21.5
Carapace length	13.5	13.0	13.6

Habitat. The specimens were collected on the reef flats during periods of low water at night with the aid of a light.

Colour. The colour pattern is closely similar to that in the illustration by Gordon (1936). The rostrum in the distal half is red but the tip is whitish. The carapace is spotted with many red subrectangular or elliptical patches, which are larger posteriorly. Anteriorly these patches are pale or absent. In the abdomen are several vertical, irregular patches on each somite; two vertical lines of irregular form are present on the second somite; a large round patch is prominent on the dorsolateral surface of the third somite; each of the last three somites has one or two rather broad bands of the same colour. The sixth somite has a red spot proximally and at the upper and the lower corner, although in Gordon's (1936) illustration longitudinal bands are shown above and laterally. The telson is coloured red except for a short transverse zone proximal to the middle. In the ambulatory pereiopods the merus bears two transverse reddish bands, the distal segments being semitransparent. The antennal flagella are pale red.

Discussion. In the genus *Rhynchocinetes* H. Milne-Edwards ten species are known at present, of which *R. rugulosus* Stimpson, *R. uritai* Kubo and *R. hiatti* Holthuis and Hayashi, are known from Japan. *Rhynchocinetes hiatti* as well as *R. rugulosus* is placed in the same category within this genus, in which the species bear three teeth on the dorsal border of the carapace, and the rostral articulation is incomplete. In the other category, as represented by *R. uritai*, two teeth are present on the carapace, and the rostral articulation complete. The present specimens from Okinawa, the Ryukyus, should be placed in the former group, and are especially similar to *R. hiatti* and the Atlantic species, *R. rigens* Gordon. The differences between these species were already pointed out by Holthuis and Hayashi (1967).

The Ryukyu specimens may be referred not to *R. hiatti*, but to *R. rigens* in the general features including the diagnostic colour pattern. They, however, are revealed to be different from the specimens from Florida in the following points.

1. In the Ryukyu specimens the body looks larger and stouter than in the Florida ones. Manning (1961), however, recorded, based upon western Atlantic specimens, a remarkable range of variation even in the ovigerous females ranging from 3.9 mm to 17.3 mm in the carapace length.

2. The pereiopods are much stouter in the Ryukyu specimens. The propodus of the third pereiopods measures eight times as long as broad, and 4.5 times the length of the dactylus. On the other hand, in the Florida specimens it measures about 10.5 times and 6.5 times, respectively.

3. The outer antennular flagellum is somewhat more thickened and shorter than in the Florida specimens. In the Ryukyu specimens, as noted in the description, the thickened portion falls distinctly short of the subapical teeth on the upper rostral border, whereas in the Florida specimens the thickened portion is rather slender and longer, reaching the subapical teeth.

4. The Ryukyu specimens bear the much broader endopod of the first pleopod in male, which is bell-shaped with terminally a narrow lobule. This looks closely

similar to one of the figures of *R. rigens* (Text-fig. 5e) given by Gordon (1936). In the Florida specimens, like Gordon's (1936) illustration (Text-fig. 4d), it is narrow and bar-shaped with a small lateral projection. It has been noted that the first pleopod of the male in *Rhynchocinetes* varies considerably in size and form, and that the appendix interna varies with age. Moreover, the variation of the appendix interna was indicated in *R. typus* by Gordon (1936) and in *R. rugulosus* by Hale (1941).

Although the differences mentioned above appear to be worth the basis for the subspecific separation of the Ryukyu specimens from the Atlantic ones the author would at present consider them conspecific, taking the peculiar variations in *Rhynchocinetes* into account.

Only a few coral-inhabiting species in the Pontoniinae of the Palaemonidae and in the Alpheidae, have a wide-spread distribution both in the Indo-West Pacific and in the East Pacific through the East Pacific Barrier. Exceptionally, pantropical species such as *Brachycarpus biunguiculatus* (Lucas) of the Palaemonidae and *Gnathophyllum americanum* Guérin of the Gnathophyllidae are also known. The discovery of the present species from the Ryukyu Islands, like the above-species, tends to establish the pantropical distribution of *Rhynchocinetes*.

The probable reason for the ineffectiveness of the Pacific Barrier for some species was mentioned by Patton (1966). The significance of the pantropical distribution in some marine organisms, including the above-mentioned caridean shrimps, may have geological implications, as suggested by Ekman (1953).

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